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FORM PTO-1390 (REV. 5-93)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER 10191/1855

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)
09/856905

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE(S) CLAIMED
PCT/DE00/02090	(27.06.00) 27 June 2000	(29.09.99) 29 September 1999

TITLE OF INVENTION
METHOD AND DEVICE FOR SELECTING DIFFERENT FUNCTIONS FOR IMPLEMENTATION AT A TERMINAL OF A CONTROL UNIT

APPLICANT(S) FOR DO/EO/US

KOHLER, Rolf; GIESELER, Steffen; EGE, Taskin

Applicant(s) herewith submit to the United States Designated/Elected Office (DO/EO/US) the following items and other information

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) immediately rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)) (unsigned).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
    ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☒ A substitute specification and a marked up version thereof.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: International Search Report and Form PCT/RO/101.

Express Mail No. EL302704221

U.S. APPLICATION NO. if known, see 37 C.F.R.1.5	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/856905	PCT/DE00/02090	10191/1855

17. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)): Search Report has been prepared by the EPO or JPO $860.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) . . . $690.00		
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) $710.00		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO $1000.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) $100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

Claims	Number Filed	Number Extra	Rate		
Total Claims	9 - 20 =	0	X $18.00	$ 0	
Independent Claims	2 - 3 =	0	X $80.00	$ 0	
Multiple dependent claim(s) (if applicable)			+ $270.00	$ 0	
TOTAL OF ABOVE CALCULATIONS =				$860	
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).				$	
SUBTOTAL =				$860	
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$	
TOTAL NATIONAL FEE =				$860	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +				$	
TOTAL FEES ENCLOSED =				$860	
				Amount to be: refunded	$
				charged	$

a. ☐ A check in the amount of $_____ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 11-0600 in the amount of $860.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 11-0600. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Richard L. Mayer Reg. No. 33,865 By Aaron C. Deditch

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5/29/2001
DATE

CUSTOMER NO. 26646

376232

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	:	Rolf KOHLER et al.
Serial No.	:	To Be Assigned
Filed	:	Herewith
For	:	**METHOD AND DEVICE FOR SELECTING DIFFERENT FUNCTIONS FOR IMPLEMENTATION AT A TERMINAL OF A CONTROL UNIT**
Art Unit	:	To Be Assigned
Examiner	:	To Be Assigned

Assistant Commissioner
for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT AND
37 C.F.R. § 1.125 SUBSTITUTE SPECIFICATION STATEMENT

SIR:

Please amend without prejudice the above-identified application before examination, as set forth below.

IN THE SPECIFICATION AND ABSTRACT:

In accordance with 37 C.F.R. § 1.121(b)(3), a Substitute Specification (including the Abstract, but without claims) accompanies this response. It is respectfully requested that the Substitute Specification (including Abstract) be entered to replace the Specification of record.

IN THE CLAIMS:

Without prejudice, please cancel original claims 1 to 9 and add new claims 10 to 18 as follows:

--10. (New) A method for selecting a function to be implemented at a terminal of a control unit, the method comprising the steps of:

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selecting the function to be implemented from one of at least two different functions by using a predefinable code for providing an implemented function; and

suppressing other ones of the at least two different functions.

11. (New) The method according to claim 10, wherein the at least two functions are implemented by at least two different signals appliable to the terminal of the control unit, one signal of the at least two different signals of the function to be implemented is selected by the predefinable code and applied to the terminal, and other ones of the at least two different signals are suppressed.

12. (New) The method according to claim 10, wherein one function of the at least two functions is implemented by a signal appliable to the terminal of the control unit, the signal of the function to be implemented is selected by the predefineable code and applied to the terminal, and other ones of the at least two different functions are suppressed.

13. (New) The method according to claim 10, wherein one of the at least two functions includes a use of the terminal of the control unit for providing a bidirectional communication connection of another control unit to the control unit.

14. The method according to claim 10, further comprising the steps of:

suppressing the other ones of the at least two different functions during a time period;

switching the function to be implemented from a previously implemented function to one of the other ones of the at least two different functions; and

suppressing the previously implemented function.

15. (New) A device for selecting a function to be implemented at a terminal, the device comprising:

a processor;

a first function path for implementing a first function; and

at least another function path for implementing at least another function;

wherein the first function path and the at least another function path run over at least two other different terminals of the processor, the first function path and the at least another function path being connected and being routed directly to the terminal.

16. (New) The device according to claim 15, further comprising an arrangement for selecting and clearing a function path of a function to be implemented independently of a code and for suppressing the at least another function path.

17. (New) The device according to claim 15, wherein the first function includes a signal output unidirectionally over the first function path.

18. (New) The device according to claim 15, wherein the at least another function includes communicating bidirectionally with a computer unit over the at least another function path.--.

REMARKS

This Preliminary Amendment cancels without prejudice original claims 1 to 9 in the underlying PCT Application No. PCT/DE00/02090, and adds without prejudice new claims 10 to 18. The new claims conform the claims to U.S. Patent and Trademark Office rules and do not add new matter to the application.

In accordance with 37 C.F.R. § 1.121(b)(3), the Substitute Specification (including the Abstract, but without the claims) contains no new matter. The amendments reflected in the Substitute Specification (including Abstract) are to conform the Specification and Abstract to U.S. Patent and Trademark Office rules or to correct informalities. As required by 37 C.F.R. § 1.121(b)(3)(iii) and § 1.125(b)(2), a Marked Up Version Of The Substitute Specification comparing the Specification of record and the Substitute Specification also accompanies this Preliminary Amendment. In the Marked Up Version, underlining indicates added text and bracketing indicates deleted text. Approval and entry of the Substitute Specification (including Abstract) is respectfully requested.

The underlying PCT Application No. PCT/DE00/02090 includes an International Search Report, dated December 4, 2000. The Search Report includes a list of documents that were uncovered in the underlying PCT Application. A copy of the Search Report accompanies this Preliminary Amendment.

Applicants assert that the subject matter of the present application is new, non-obvious, and useful. Prompt consideration and allowance of the application are respectfully requested.

Respectfully Submitted,
KENYON & KENYON

Dated: 5/29/2001

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[10191/1855]

METHOD AND DEVICE FOR SELECTING DIFFERENT FUNCTIONS FOR IMPLEMENTATION AT A TERMINAL OF A CONTROL UNIT

Background Information

The present invention relates to a method and devices for selecting at least one function which is implemented at a terminal of a control unit according to the definitions of the species of the independent claims.

German Patent Application 196 21 902 A1 describes a method of multiple allocation of a communication line of a control unit to different signals. The object of this unexamined German patent is thus based on a system for superimposing information, first item of information being represented by an analog signal and second item of information being in the form of a digital signal. At the core of the present invention is the fact that a superposed signal is formed by superimposing the digital signal on the analog signal. Since the signals are transmitted at the same time, this superimposing of signals requires synchronization. For further processing at the receiving end, this superposed signal must be broken down into the basic signals, i.e., the information analog signal and the digital information signal. It is thus possible to eliminate one input line and the terminals for this line at both ends for a controller. However, this greatly increases the expense to form the superposed signal, in particular in synchronization, and the downstream separation of the superposed signal in the controller for further processing.

Another method of eliminating terminals on microprocessors is a circuit configuration for operation of a consumer by a microprocessor as described in German Patent Application 36 24 139 A1. A reversible bidirectional terminal provided on the microprocessor itself is used to switch a consumer as well

as to detect an external consumer circuit by a manual switch. Thus, the known method of using a single bidirectional input instead of separate inputs and outputs on the microprocessor is improved such that larger, high-power consumers can be operated and displayed instead of small loads, i.e., low-power consumers. When a manual switch is operated, a potential applied to the bidirectional input of the microprocessor is pulled to ground, indicating that the manual switch has been operated, because the bidirectional input usually has a high resistance due to an internal pull-up resistor. Thus, for this special case, two functions with respect to the same consumer can be implemented at one terminal of a microprocessor. However, since the terminal used is located directly on the microprocessor, a true multifunctionality with regard to different microprocessor outputs and different consumers is not possible.

It has been found that the related art cited above cannot yield optimal results in all regards. Thus, the object of the present invention is to achieve a true multifunctionality of a terminal of a control unit or a controller and a further improvement in the methods and devices defined above.

This object is achieved through the features of the independent claims.

Advantages of the Invention

The present invention is based on a method and a device for selecting a function which is implemented in a terminal of a control unit, the function to be implemented being selected from at least two different functions. The selection of the function to be implemented is made by a predefinable code, the then at least second function being suppressed.

The at least two functions can be implemented to advantage by at least two different signals that can be applied to the

terminal of the control unit, the signal of the function to be implemented being selected by a code and applied to the terminal, the at least second signal being suppressed at the same time. Through the choice of the code, preferably in a data record that can be applied, it is thus possible to predetermine which signal is sent via the terminal of the control unit and when it is sent.

It is thus no longer necessary in applications, for example, to make adjustments in hardware, in particular resetting hardware bridges, to switch between the functions that are possible on the basis of the microprocessor signals.

A more flexible means of eliminating terminals on the controller and on the wiring harness is possible due to the selection of functions or signals by code. In the case of an application or diagnostic procedure, the corresponding lines and terminals can also be eliminated here. A plurality of terminal combinations is conceivable for different functions, which may also be selected independently of one another.

Due to the fact that the functions are not implemented by the code at the same time or the signals are not transmitted at the same time, an implementation can be accomplished more expediently in such a way that there are no functional restrictions due to the multiple signal allocation.

Preferably one of the at least two functions from which a selection is made is the use of the terminal of the control unit as a bidirectional communication connection to another intelligent unit, in particular another control unit.

Automatic detection of the functionality required in each case is possible in an expedient manner through detection of the respective predetermined code.

In addition, information that can also be predefined with the

code regarding a period of time may also be included in the predefinable code in an advantageous manner. This period of time is particularly interpreted as a waiting time after which a switch is made from the function to be implemented to another function which was suppressed during the period of time, in particular when the first function is not carried out correctly. The function to be implemented previously is then itself suppressed. This provides a simple diagnostic option, so that it is possible to switch to a diagnostic function or test function if a malfunction occurs even in the application. It is also possible to prevent the system from being caught in an endless loop when there is a failure in communication in the communication mode, for example, because the system switches to a second function after the waiting time.

It is also possible to filter out a message echo or a signal echo in an advantageous manner by preselecting a waiting time. In other words, the waiting time until detection of a response signal or an acknowledge signal is selected at least so that no unwanted echo is taken into account, and only the true response is detected and leads to a further reaction under some circumstances.

Additional advantageous embodiments can be derived from the description and claims.

Drawing

Figure 1 shows a basic circuit design for the signal switching or function switching of a signal output and use of a communication line as described.
Figure 2 shows a specific variant having open-drain outputs of the microprocessor.
Figure 3 shows a flow chart illustrating the process sequence together with the code and the waiting time for signal selection. This process can be executed in the microcomputer or in another external control unit.

Description of Embodiments

Figure 1 shows a schematic circuit diagram in a controller 100 for implementing of two functions and/or for selecting from two signal paths at a controller terminal 106. A microcontroller 101 is connected to an element 103 by two lines 107 and 108. Microcontroller 101 is also connected to an element 102 by lines 109 and 110. Element 103 is connected by a line 113 to another element 104. Elements 103 and 104 as well as their connecting line 113 can be combined in one element 114. Elements 114 and 102 which are being discussed here lead over lines 111 and 112 to the same controller terminal 106. Different functions are implemented at controller terminal 106 by elements 102 and 114. In a specific embodiment, an output signal of microcontroller 101, e.g., an rpm signal, i.e., an output signal that can be used for the speedometer in the vehicle, is sent over line 108 to element 103. Element 103 is a logic module, such as a gate module, in particular a NAND gate which outputs to line 113 the information of the output signal on line 108 according to the signal on line 107. The signal on line 107 thus functions as a type of release signal for line 108, i.e. its signal.

The signal on line 113 then reaches element 104. In this specific embodiment, element 104 is an output stage module. This output stage module for signal output is designed, for example, as a non-inverting open-drain output stage or an open-collector output stage, depending on the technology. Then the information content of the output signal can be output from line 108 to controller terminal 106 over line 112 through this output stage module 104; this represents a first function due to the analysis of the signal or the display of the signal in an actuator, in particular the aforementioned speedometer. A first function path is thus composed of microcontroller 101, lines 107 and 108, element 114 and line 112 to terminal 106.

Lines 109 and 110 are thus lines for input and output

information and input and output signals of microcontroller 101. The signals of unidirectional lines 109 and 110 are then transmitted over a serial data interface 102 to bidirectional line 111. Line 111 can therefore function as a communication line with microcontroller 110 via controller terminal 106; this represents a second function. A second function path is thus composed of microcontroller 101, lines 109 and 110, element 102 and line 111 to terminal 106.

Serial data interface 102 is designed to be non-inverting, for example. Serial data interface 102 also has an output stage module on the bidirectional side so that both elements 114 and 102, which are implementing functions for terminal 106, can be routed jointly to controller terminal 106 over a consumer 105, in particular a resistor, at the power supply voltage, i.e. power supply voltage potential Ubat, as illustrated in Figure 1. Like output stage module 104, this output stage module is then also designed as an open-collector output stage module or as an open-drain output stage module, depending on the technology, thus permitting the link shown here.

Due to the use of an inversion in element 103 or element 104, e.g., by using the NAND function in element 103, the linking of lines 111 and 112, e.g., as wired AND to controller terminal 106, guarantees that communication line 111 is cleared for the case when the signal output over lines 107 and 108 of microcontroller 101 is suppressed, i.e., a zero signal is applied. In the case of a suppressed output, i.e., an actual zero signal over line 113, the inversion in 103 yields a one signal. In the case of a subsequent wired AND linking of lines 111 and 112, the information on line 111 is thus output to output 106, i.e., the communication function is ensured.

Comparable implementations are of course also possible by the fact that the outputs of microcontroller 101 and the outputs onto lines 111 and 1112 are either active high or active low and the wiring is in positive or negative logic, thus yielding

a wired AND or wired OR at terminal 106.

For the sake of simplicity, components of controller 100 which are not needed for the description according to the present invention are omitted in Figure 1.

Figure 2 shows a specific circuit design in a controller 100b, which depends in part on the utilization of the module resources in controller 100b. Thus, for example, the NAND function from Figure 1 may be formed with the help of port configuration options of microcontroller 101 and the inverter functions of other modules. The output on line 107 may thus be configured as an input/output low or as an open-drain output. The output signal on line 108 is sent over an open-drain output on this line, for example. Due to these port configuration options of the outputs for lines 107 and 108, they can be pulled to a power supply voltage UV, which is smaller than Ubat in particular, over a consumer 201, in particular a resistor. Thus, there is an AND link between both signals or lines 107 and 108 to line 204. A downstream inverting low-level signal output stage as part of an existing integrated circuit completes the implementation of the NAND function as intended in Figure 1. The first function path here is thus composed of microcontroller 101, lines 107 and 108, consumer 201, line 204, element 200, consumer 202, line 203, element 205 together with reset line 206 and line 112 to terminal 106.

Inverting low-level signal output stage 200 may be part of serial data interface 102, for example, and may nevertheless be used by the first function path. For adjusting the level, the signal on line 203 output from inverting low-level signal output stage 200 is also connected to the power supply voltage over consumer 202. An output stage module 205 is connected to line 203, comparable to element 104 in Figure 1, and may also be designed as a non-inverting open-drain output stage. In addition to the signal on line 203, which contains the rpm

information, etc., a reset signal is also sent to output stage module 205 over line 206. This signal is sent from the reset circuit of the microcontroller core to output stage module 205.

The reset signal ensures that output stage module 205 will not supply an active low signal when the processor is inactive. This ensures that module 205 will not seize terminal 106 when the processor is inactive.

The output signal from output stage module 205 then goes again to line 112. Function path 2 starts from the serial data interface of microcontroller 101 over output line 109 and input line 110, as described for Figure 1. Serial data interface 102, in particular non-inverting and having an open-drain output stage module, may also be part of a multifunction IC installed in the controller. Thus, the module, i.e. the integrated circuit, may also contain a voltage stabilizer having reset signal generation. Thus, these parts, i.e., serial data interface 102 and inverting low-level signal output stage 200 are linked to the reset signal, even if they are in the same module. The outputs of the integrated circuit, i.e. the multifunction module, optionally containing elements 200 and 102, then have a high resistance in reset mode.

The module outputs, i.e., lines 112 and 111 or the signals then on these lines, are then pulled again to the voltage or potential Ubat over consumer 105 and are thus linked to terminal 106 of the controller. Thus, here as in Figure 1, the two functions, i.e. the respective signals, are sent separately to microcontroller 101. They are linked only on the downstream hardware as described previously. The unwanted function, i.e. the respective signal, is suppressed by the software by switching it to a passive mode.

The signal on line 204 or line 204 itself becomes passive when a zero or low is output on line 108 (switching from input to

output active low). Line 108 is necessary when the signal on line 107 cannot be switched off by processor 101.

The signal on line 109 becomes passive when it is held fixedly at one or high. In the case of the communication function, this corresponds to switching from serial output to static port active high.

Figure 3 shows a process sequence for function switching by means of a code, so that hardware signals are defined by the software. This process can take place in controller 100 or 100b itself or it may be carried out completely or in part by another control unit, which is connected over terminal 106, e.g., an application device. The start of a run through the process takes place in block 300. This may be initiated externally or internally. In block 301, the code or pin datum Dp is input or initialized. This may take place in an applicable data record, for example. This input of the pin datum may take place individually or in the form of a reset-controlled or time-controlled table having a plurality of successive pin data. It is thus possible to specify in the program run, depending on pin datum Dp, i.e., through the software, which function is or will be implemented on terminal 106.

In block 302 the code is read in the form of pin datum Dp. Then in downstream query 303, a check is performed to determine whether pin datum Dp corresponds to a stored reference code Dp1. If this is the case, the system goes to block 304 where function 1, i.e., the function path is implemented with block 114. For example, the aforementioned output signal, i.e., a signal 1, is output to pin 106 here. In this case, the output signal on line 108 is cleared by the release signal on line 107 and the function of communication line 111 is suppressed by switching data lines 109 and 110 to a passive mode.

Then a time-controlled check is performed in query 305, in particular after a predefinable period of time has elapsed, to determine whether function 1, specifically the signal output here, is to be continued. Test criteria for query 305 may include, for example, an end acknowledgment in the signal path, a timing sequence of a timing element or a demand request for function 2. Likewise, any reset may also be considered a termination condition for the signal output.

In the case of the desired termination of function 1, the process goes to block 315, the end of the run. In the other case, function 1 is carried out further. If the code read out does not correspond to Dp1, the process goes to query 306, where a check is performed to determine whether the pin datum, i.e., code Dp, corresponds to another predefinable code Dp2. If this is the case, the process goes to block 307.

Since function 2 provides the use of terminal 106 as a communication connection in this specific embodiment, a message is sent in block 307 to wake up the measuring means or the application means in the form of a certain protocol, for example. This wake-up signal in block 307 leads to block 308.

Function 2, the use of terminal 106 or line 111, is designed as a bidirectional communication connection here, signals 2 belonging to function 2 being transmitted over controller terminal 106 in particular. Controller 100 or 100b is then ready to receive a message over communication line 111 in particular.

Then a check is performed in downstream block 309 to determine whether or not function 2 is to be continued. Here again, this check can take place via an end acknowledgment over communication line 111, a predefinable timing sequence or a possible demand request for function 1. If function 2 is to be continued, the process goes back to block 308. In the other case, it goes to block 315, the end of the run.

If the code read out in query 306 does not correspond to predefinable code Dp2, the process goes to query 310, where a check is performed to determine whether code Dp is between codes Dp1 and Dp2 mentioned above. If a length of 8 bits, i.e., one byte, is selected for code Dp, then Dp1 would correspond to 0, for example, and Dp2 would be 255. Thus, the steps in between, i.e., 1 through 254, would be checked in query 310. If code Dp does not correspond to a value between Dp1 and Dp2, then an error message that no valid pin datum had been entered, for example, is output in block 311. Likewise, a reset initiation would also be conceivable in block 311. From block 311, the system goes again to the end of the run in block 315. However, query 310 is optional inasmuch as there is no other option here due to the allocation of codes Dp1 and Dp2 and the representation of Dp of 8 bit here to the representation of 0 to 255, so pin datum Dp is invalid.

In addition, codes with special meanings may also be assigned. For example, Dp1 may be assigned the special meaning that a switch is made to function 1 immediately and irreversibly (except by reset) in the case of Dp1. Likewise, Dp2 may be assigned the special meaning that there is never a switch to function 1 in the case of Dp2, waiting time Tw being allocated more or less infinitely.

If a value between Dp1 and Dp2 is selected for the code, the process goes to block 312, where a wake-up signal as in block 307, e.g., in the form of a special protocol, is sent to the measuring means or application means or other controllers which are connected at terminal 106. At the same time, a waiting time Tw during which communication line 111 is kept activated, can be predefined here through the code. A possible stipulation for waiting time Tw is, for example, multiplication of code value Dp, i.e., 1 through 254 here, by a predefinable time unit value twn which may be 100 ms, for example. Thus for this specific case, programmable waiting time Tw varies between 100 ms and 25.4 sec. Programmable

waiting time Tw ensures that, for example, an echo of the wake-up signal or wake-up protocol is not misinterpreted as establishing communication, because a signal input is registered as communication only following the possible echo occurrence time. In the case of a connection of an application device to terminal 106, it is appropriate to set waiting time Tw so that the application device can still make an acknowledgment before a waiting time Tw that is too short has elapsed. If the application device needs half a second to one second, for example, until it begins to send again after an interruption, e.g., a reset, it is appropriate in this case to set waiting times longer than one second. A very flexible adaptation to a variety of different application devices is thus possible.

Query 313 checks to determine whether communication with a measuring means or the application means has come about on communication line 111 over pin 106. If this is the case, the system goes to block 308, for execution of function 2 as described above. If no communication takes place, query 314 checks whether programmable waiting time Tw has elapsed. If this is the case, it goes to block 304, for example, where function 1 is carried out. As an alternative, it could also go to block 315 at the end of the run. If the waiting time has not yet elapsed, a check is also performed in query 313 to determine whether the desired communication has taken place. This check can take place, for example, on the basis of the input of acknowledgment information as a reaction to the wake-up signal or the wake-up protocol message. In general, in the specific embodiment of function 2 as a communication line, communication line 111 is active for the codes leading to function 2 after each reset and function 1 is suppressed. Thus, if there has not been any communication with a measuring means on communication line 111 within the waiting time, communication line 111 is deactivated for this operating cycle, and the output of signal 1, i.e., function 1, is activated. The respective operating cycles (see queries 305

and 309) end, for example, with a demand request of the respective function or specifically by switching on or other reset.

What is claimed is:

1. A method for selecting a function which is implemented at a terminal (106) of a control unit (100), the function to be implemented being selected from at least two different functions (304, 308), wherein the function to be implemented is selected by a predefinable code (Dp), and the at least second function is suppressed.

2. The method according to Claim 1, wherein the at least two functions (304, 308) can be implemented by at least two different signals (signal 1, 304, signal 2, 308) that can be applied to the terminal (106) of the control unit (100), the signal of the function to be implemented being selected by a code (Dp) and applied to the terminal (106), and the at least second signal being suppressed.

3. The method according to Claim 1, wherein one function of the at least two functions (304, 308) can be implemented by a signal (signal 1, 304), and the signal can be applied to the terminal (106) of the control unit (100), the signal (signal 1, 304) of the function to be implemented being selected by a code (Dp) and applied to the terminal (106) and the at least second function (function 2, 308) being suppressed.

4. The method according to Claim 1 or 3, wherein one of the at least two functions (304, 308) is the use of the terminal (106) of the control unit (100) as a bidirectional communication connection (111) of another control unit to the control unit (100).

5. The method according to Claim 1, wherein the predefinable code (Dp) also includes information that can be predefined with it regarding a period of time (Tw) after which a switch is made from the function to be implemented to another function which was suppressed during the period of time (Tw), in particular the at least second function, and the function

to be implemented previously is suppressed.

6. A device for selecting a function which is implemented at a terminal (106) of the device, comprising a processor (101) and a first function path (101, 107, 108, 114, 112) over which a first function is implemented, and having at least one other function path (101, 109, 110, 102, 111) over which another function is implemented, wherein the function paths run over at least two different terminals (108, 109) of the processor, the at least two function paths are connected and are routed directly to the one terminal (106) of the device.

7. The device according to Claim 6, wherein it contains means which select and clear the function path of the function to be implemented independently of a code (Dp) and suppress the at least one other function path.

8. The device according to Claim 6, wherein a signal (signal 1) is output unidirectionally over the first function path (101, 107, 108, 114, 112) as the first function.

9. The device according to Claim 6, wherein a bidirectional communication with a computer unit is performed over a second function path (101, 109, 110, 102, 111) as the at least second function.

Abstract

A method and a device for selecting a function which is implemented at a terminal (106) of the device, having a processor (101) and a first function path (101, 107, 108, 114, 112) over which a first function is implemented, and having at least one other function path (101, 109, 110, 102, 111) over which another function is implemented, and the function paths run over at least two different terminals (107-110) of the processor, the at least two function paths are connected and are routed directly to the one terminal (106) of the device. The selection of the function to be implemented is made by a predefinable code (Dp), and the at least second function is suppressed.

(Figure 1)

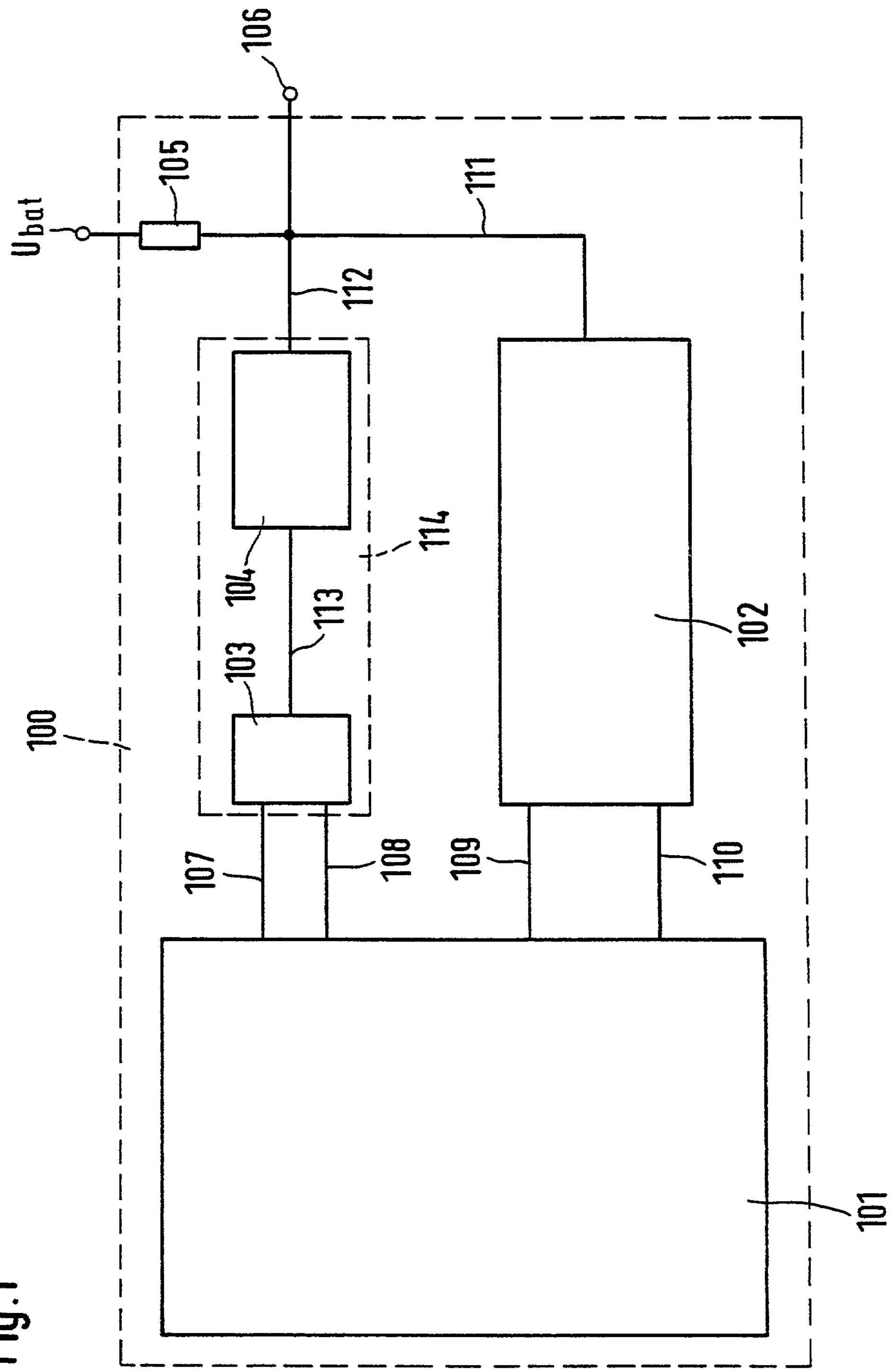


Fig.1

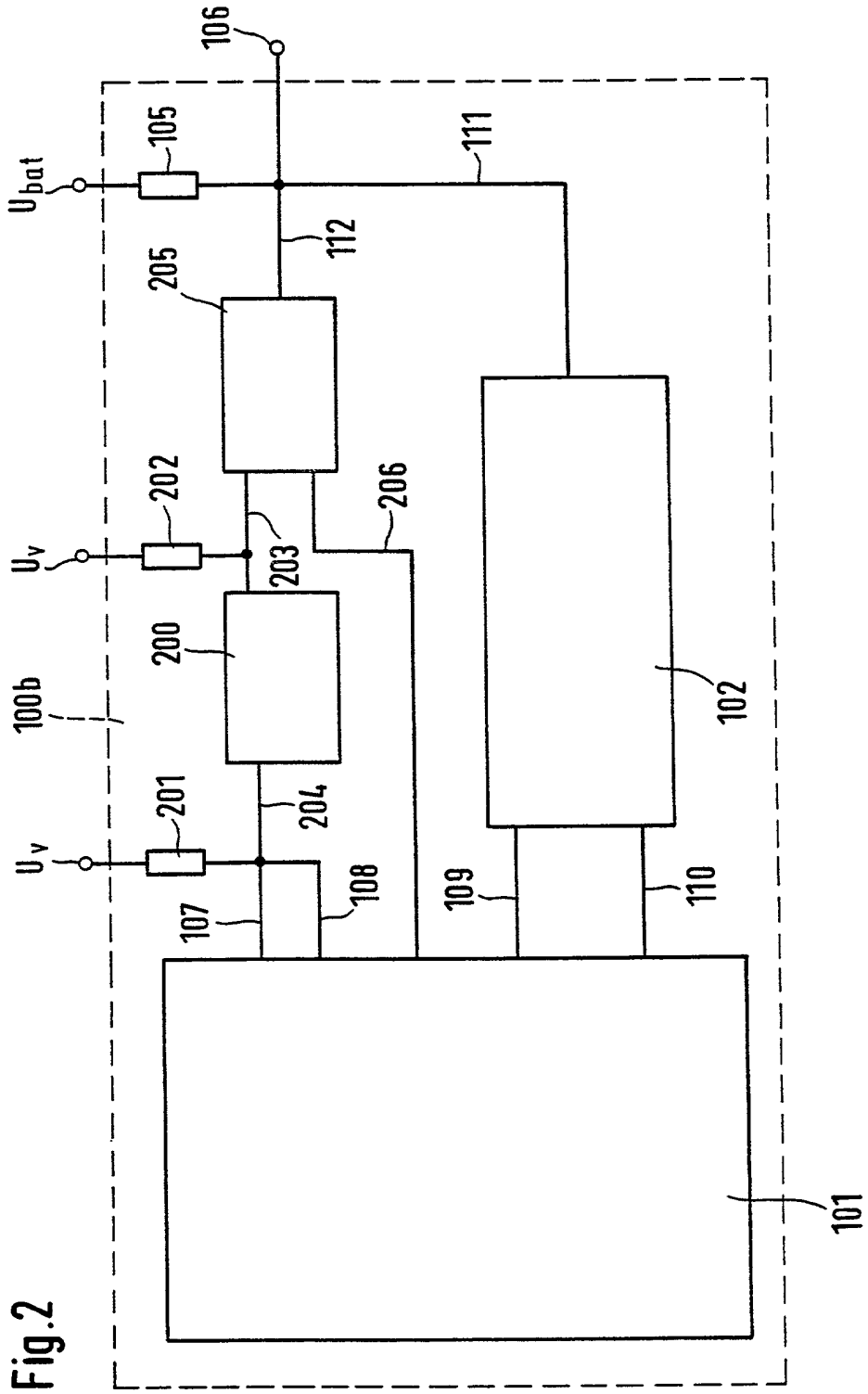
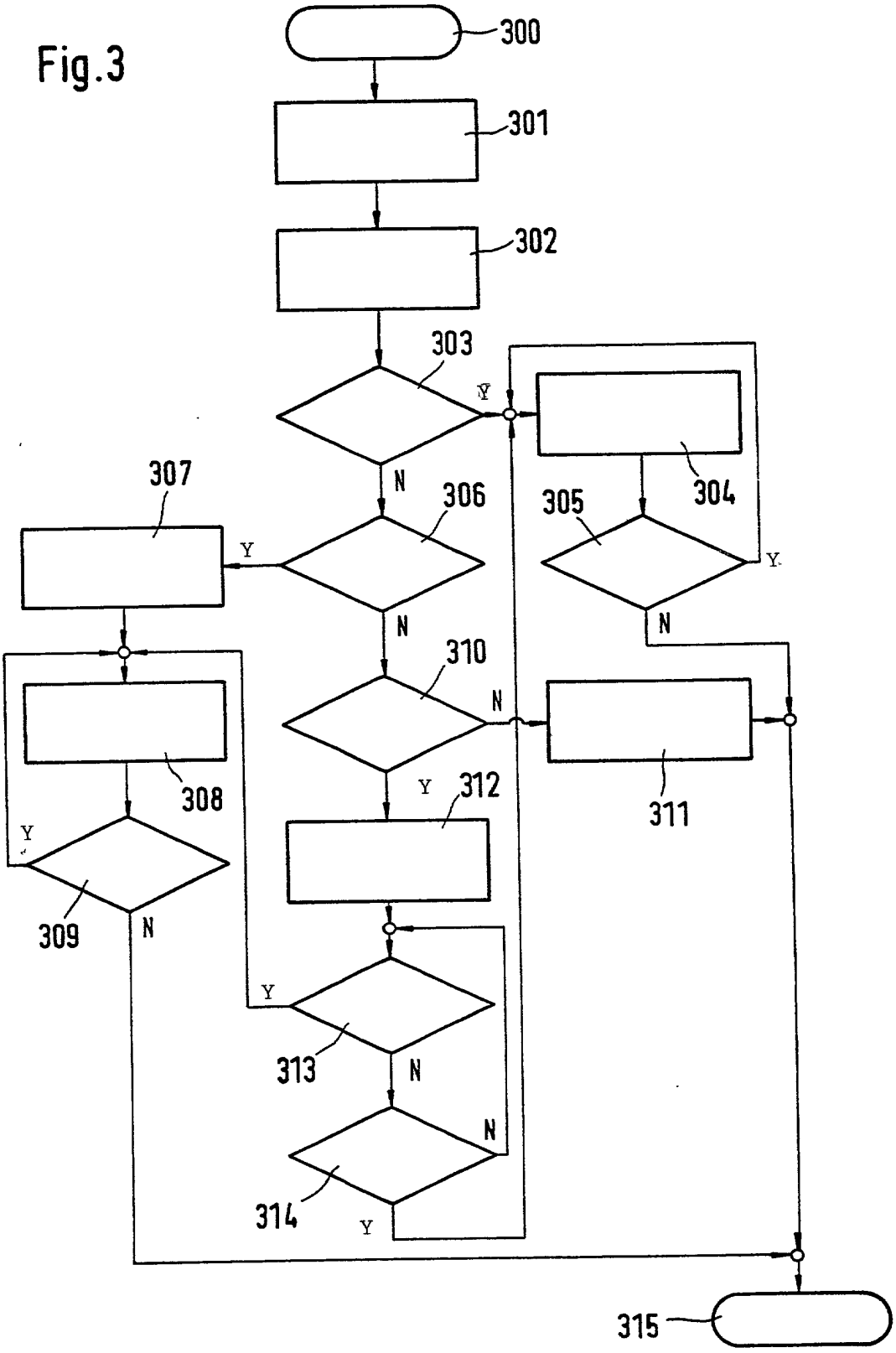

106
105
U_{bat}
111
112
205
202
206
U_v
203
200
100b
102
201
204
U_v
108
107
109
110
101

Fig.2

Fig.3



[10191/1855]

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **METHOD AND DEVICE FOR SELECTING DIFFERENT FUNCTIONS FOR IMPLEMENTATION AT A TERMINAL OF A CONTROL UNIT**, the specification of which was filed as PCT/DE00/02090 on June 27, 2000.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

~~EL302704221~~

EL244508450

PRIOR FOREIGN APPLICATION(S)

Number	Country filed	Day/month/year	Priority Claimed Under 35 USC 119
199 46 548.7	Fed. Rep. of Germany	29 September 1999	Yes

And I hereby appoint Richard L. Mayer (Reg. No. 22,490) and Gerard A. Messina (Reg. No. 35,952) my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful and false statements may jeopardize the validity of the application or any patent issued thereon.

1-50

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